



केन्द्रीय आलू अनुसंधान संस्थान Central Potato Research Institute Newsletter

Number 45

July -September - 2011

Research Highlights

Baby Potatoes: A Novel Venture for Potato Growers

Potato, the potential food crop can change the fate of it's growers with adoption of innovations and entrepreneurship. 'Baby potatoes' is one such example and opportunity. These are consumed in hundreds of dishes as oven baked, boiled, partially fried or in salad. One more way suited to Indian taste may be in recipes like 'Dum aloo'. Baby potatoes should be

round and uniform in shape and size. Size is for a bite (<40 mm) and may be fine graded further for uniformity. Tubers should have shallow eyes, white or red skin and creamy, yellow or coloured flesh. Dry matter content is required below 18%, and end product should have typical potato flavour. Glycoalkaloid content (<20mg/100g fresh weight) has to be minimal. Among commercial varieties, Kufri Himsona has been identified as the best for baby potatoes. Production technologies have been perfected for maximizing baby grade tuber yield

with a check on cost of cultivation. Kufri Himsona has desirable dry matter content (< 18%) at 60 days and comparatively higher tuber number per plant (18-20). Tubers have shallow eyes, round shape, white skin and creamy flesh. It has typical potato flavour and also the glycoalkaloid content in safe limits.

Two crops of baby potatoes of sixty days each may be taken in a season for driving maximum benefits by adjusting the time of planting. One fourth of recommended dose of fertilizers (68 N + 20 P₂O₅ + 38 K₂O kg/ ha) is required for Kufri Himsona for quick tuberization and optimum baby potato size. Water is



Harvested Baby potatoes

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applied frequently and light so that it does not touch more than 2/3 part of ridges. Kufri Himsona has the potential of 20-24 t/ha of baby grade potatoes in double cropping. Uniformly graded, defect free and washed potatoes in suitable packing are likely to bring remunerative prices to potato farmers. Likewise, the industry ought to pay premium price of raw material suitable for processing and export.

– Sanjay Rawal, BP Singh,
Devendra Kumar, MA Khan,
Rajeev Kumar and Vishal
Chaudhary

Spodoptera litura: New Enemy of Spring Crop of Potato

Potato, a crop of immense value suffers from a number of insect pests affecting its production and quality. Spring crop of potato which is taken for table purpose and harvested by end of March in Indo-Gangetic plains, has been found under heavy attack of *Spodoptera litura* (Fab.) which is commonly known as tobacco cutworm, or cluster or tobacco caterpillar. It is a polyphagous pest and damages numerous crops in India and many other countries of the world. The larva of this insect feeds primarily on

the leaves of more than 120 species of fruits, vegetables, ornamentals, and many other plants.

Spodoptera litura could become a major pest of potato attacking the crop in spring season if the crop is left unattended and harvested late. In the year 2010-2011, the spring crop of potato was devastated by larvae of this insect. There were even more than 10 larvae on a single tuber. The calculated attacked tuber rate (ATR) was cent per cent in April first week. The high population of *S. litura* on spring crop of potato could be related with rising minimum temperatures and existing relative humidity.

– Kamlesh Malik, BP Singh and
SK Luthra

CPRI Develops Three New Decision Support Tools

CPRI has added three new tools during the year to the list of Decision Support Tools developed at the Institute. The first one named “Plausible Potato Growing Seasons Estimator” (PPGSE) is for estimating the number of growing seasons and their duration for any location. The tool screens the maximum and minimum temperature of any location according to maximum and

minimum threshold limits set by the user and extracts those periods which meets the criteria for a period of more than 70 days continuously.

The next tool is the “Potato Potential Yield Estimator”. This tool estimates the potential potato yield based on the FAO Agroecological Zones model for any location. The input requirements for this tool are daily weather data, geographical co-ordinates, start and end of the growing season. This tool is complimentary to the PPGSE because once the growing seasons are identified, the user needs to know the expected yield of the different growing seasons.

The third tool is the “Potato Temperature Stress Degree Hours”. This tool has been developed to estimate the magnitude of heat stress at any location. This tool would be useful in evaluation of genotypes tolerant to heat stress and are tested across space and time under field conditions by manipulation of date of planting or choosing sites where high temperature prevails.

Modified Medium for Micropropagation of Recalcitrant Potato

In order to improve *in vitro* response of the recalcitrant potato cultivar Kufri Jyoti, a study was conducted in non-hermetic culture room with different concentrations and combinations of NH_4NO_3 , GA^3 and NAA. Increasing ammonium nitrate concentration in the standard MS medium (from 20.63 mM to 25.79 mM) and supplementation with GA^3 (0.58 μM) as well as NAA (0.1 μM) significantly improved the *in vitro* response of recalcitrant cultivar Kufri Jyoti in terms of shoot length, number of leaves, number of nodes and inter nodal length. Therefore, to enhance the



Adult and Larvae of *Spodoptera litura*



in vitro multiplication rate of recalcitrant potato cultivar Kufri Jyoti, this new concentration of media with sucrose (30 gl-1) and its solidification with phytigel is recommended.

– EP Venkatasalam, Jyoti Latawa, SK Chakrabarti, KK Pandey, Richa Sood, Vandana Thakur and B P Singh

Training & Technology Transfer

Training Programmes Organised at CPRI and Regional Stations

- ◆ CPRI organized three-day training for seed potato agronomists of Mahindra and Mahindra Ltd., Mohali on “Techniques for quality seed potato production” during July11-13, 2011. 18 agronomists participated in this training and were trained on different aspect of seed potato cultivation.
- ◆ The Division of Social Sciences organized 8-days Model Training Course on “Production for processing Potatoes and Post Harvest Technologies” from 20-

27 September, 2011 at Shimla. The training was sponsored by Directorate of Extension Govt. of India, New Delhi. The main objective of this training was to improve the knowledge and skills of extension officers of state agriculture/hort. departments regarding the processing aspects and post harvest operations in potato crop. A total of 20 extension functionaries from 12 states participated in this training.

- ◆ One On-campus training for potato growers was conducted during 7-8 September, 2011 under the project “Training entrepreneurial skills of



farmers in potato based farming system of Himachal Pradesh” at Shimla. A total of 23 farmers attended this training programme from three different districts of Himachal Pradesh.

- ◆ A training was conducted at CPRS, Patna for farmers of Nawada district of Bihar on 24 August, 2011 and 38 progressive farmers participated in this programme. Besides, another training programme was organized on 30th September, 2011 under the aegis of BASIX for the 27 farmers of Purnia, Monghyr and Nawada. CPRS, Patna also participated in a Kisan Mela organized by Agriculture Department, Govt. of Bihar during 10-13 August, 2011 on the occasion of Van Mahotsav.
- ◆ A farmers training was conducted on “Post Harvest Management in Potato” on 8/8/2011 at CPRS, Shillong premises wherein 50 farmers’ from nearby villages participated. Besides, On-farm training was also conducted at Myllem village, Shillong on “TPS technology for Potato production on 3/9/2011 wherein 50 farmers’ participated.

- ◆ A Farmer's Training cum Field Day was organized on 28th July 2011 at CPRS, Muthorai, Ooty. Twenty one farmers from Nanjanad and Hosahatty villages of the Nilgiris district participated in the programme.

Live Phone- in Programmes

Several expert scientists of CPRI, Shimla participated in the Live-phone in programmes on Doordarshan and All India Radio (AIR) from July to September, 2011 as given below:

Month	Title/Topics
July	Inter-culture practices in potato on Doordarshan- Dr. SS Lal
August	Fugal, soil borne disease and insect-pest management in potato crop in higher hills of HP on Doordarshan- Drs. Sanjeev Sharma & VK Chandla
	Radio talk on Suitable potato varieties for Himachal Pradesh- Dr. Jai Gopal
	Radio talk on Disease management in Potato- Dr. BP Singh
September	Live phone in programme on Doordarshan on Harvesting and post harvest operations of potato in higher hills of HP- Drs. Brajesh Singh & Vinod Kumar
	Radio talk on Storage of potato in high hills of HP- Dr. Brajesh Singh
	Recording at AIR on Value added products of potato- Dr. Pinky

Information Technology Training Course for IGNOU Students

CPRI Library organized a 17 days computer, IT, and database creation and operation practical training for Bachelors and Masters Degree students of Library and Information Science, IGNOU, Regional Centre, Shimla. The course was organized during 26th Aug 2011 to 11th Sept, 2011 at the institute library. A total of 17 students BLIS and MLIS from different parts of Himachal and neighbouring states attended the course for partial fulfillment of their Bachelors and Master Degree Programmes.

Important Meetings & Visitors

Research Advisory Committee Meeting Held at Shimla

The Research Advisory Committee meeting was held at CPRI, Shimla during 16-17nd August 2011 under the chairmanship of Dr. KR Dhiman, Vice Chancellor, YS Parmar University of Horticulture and Forestry, Solan. Dr Bir Pal Singh, Director, CPRI extended formal welcome to the committee. He solicited advice and guidance of the RAC

remarks emphasized on low productivity in rainfed areas and north east, early maturing varieties with late blight resistance, increasing cropping intensity and increasing processing. Dr. Umesh Srivastava, ADG (Hort), ICAR, Dr. MN Khare, former Dean of JNKVV, Jabalpur and Dr. MS Kadian, Regional Research Scientist of CIP, New Delhi and Dr. S Panigrahy, ISO, Ahmedabad were the other advisory members present in the meeting. The action taken report was presented to house by Dr. R Ezekiel, Member Secretary.

During the meeting review of the research programmes was done for the work done in the previous year and the plan of work was presented for the year 2011-2012 by various programme leaders. Various recommendations were made by the Chairman and the RAC members for bringing about improvements in the new research programmes.

2nd Institute Research Council Meeting

The 2nd Institute Research Council meeting was held at CPRI, Shimla on 19th and 20th August 2011 under the chairmanship of Dr. Bir Pal Singh, Director, CPRI. It was attended by 55 scientists from CPRI headquarters and its regional stations. The basic objective of this meeting was to review the

for improving the research programmes of the Institute. Dr Dhiman in his



A view of RAC meeting at CPRI



Chairman addressing the IRC

action taken on the recommendations of IRC meetings of 2010 and discuss/finalize the work plan for 2011-12 of all the research programmes. During the opening session of IRC, Dr. SS Lal, Secretary, IRC welcomed the chairman and the scientists and congratulated newly appointed Head of Stations and Scientists and the award winners of different awards and fellowships. Chairman, IRC emphasized that the scientists posted at regional stations should visit headquarters at least once in a year. He advised that all the research programmes should aim at conversion of research output in form of a technology/product for higher visibility.

During the two days IRC meeting the progress of research programmes were presented by the researchers and elaborate discussions were held on the work plan. Special presentations were also made on research prioritization, technology development and on involvement of technical officers as programme associates.

During the concluding session, Chairman suggested the scientists to develop competence through more discussions and cohesiveness and mentioned that young scientists should bring new ideas and utilize wisdom and experience of senior scientists for developing the research programmes.

Group Meeting of AICRP (Potato) held at Raipur

The 29th Group Meeting of AICRP (Potato) was organized at Indira Gandhi Krishi Vishwavidyalaya, Raipur (Chhattisgarh) during September 10-12, 2011. It was attended by a large number of delegates as well as dignitaries from Indian Council of Agricultural Research and State Agricultural University and representatives from the industries. A Farmers Interface was also organized on the occasion and the farmers were addressed by both Dr Charan Das Mahant, Hon'ble Minister of State for Agriculture and Food Processing Industries, Government of India and Shri

Chandrashekhar Sahu, Hon'ble Minister of Agriculture, Veterinary, Fisheries & Labour, Government of Chhattisgarh. During the Workshop, the action taken on the recommendations of the 28th Group Meeting held at Central Potato Research Institute, Shimla were reviewed in the presence of Dr HP Singh, Hon'ble Deputy Director General (Horticulture), ICAR, New Delhi. The various actions taken were discussed thread bare. The Deputy Director General (Horticulture) appreciated the work done by the various AICRP (Potato) Centers, where good work has been carried out. He also cautioned all the AICRP (Potato) Centers where work was not up to the mark and also briefed them about the monitoring mechanism developed by the ICAR. He also gave many suggestions for further studies.

There were three technical sessions during the Workshop in which the results of various trials conducted during the past year were discussed. Based on the recommendations, it was decided that two hybrids viz., MS-99-1871 and JX-576 may be recommended for release for the plateau regions and Indo Gangetic plains, respectively. The technical programme for the next year was also finalized after exhaustive discussions.

NAIP CAC Meeting at Shimla

The sixth meeting of Consortium Advisory Committee was held on 3rd September, 2011 at the Central Potato Research Institute, Shimla. Dr. P.C. Gaur, Chairman CAC, chaired the meeting. At





Members of the NAIP CAC meeting

the outset, the members observed two minutes silence to condole the untimely demise of Mrs. Santosh Banswal, Editor, Bhoo-Bharti (an agriculture based hindi magazine) and an active CAC member of NAIP project.

Dr. BP Singh, Director, CPRI and Consortium Leader welcomed all the members of CAC and CIC and mentioned that nearly 80 per cent of the work has been successfully accomplished. Some of the private companies had left the project hence the activities associated with them could not be carried out. There were several major achievements in the project which included development of dip-stick assay for detection of viruses X and Y, use of aeroponics in mini-tuber production, transfer of tissue culture technology to associate partner M/s Bhatti Farms, Jalandhar and, development and release of variety Kufri Frysona for preparation of French fries.

Dr. P.C. Gaur, Chairman CAC, in his opening remarks conveyed his happiness on the release of French fry variety Kufri Frysona. He expressed satisfaction at the progress of work and the funds utilization. He mentioned that in development and use of new technologies (viz. aeroponics for mini-tuber production, bioreactor for mass production of micro-

tubers, etc.) the cost-benefit ratio should always be kept in mind. Dr. BP Singh presented the 'Action taken' report on recommendations of Fifth CAC Meeting held on 26th November, 2010. This was followed by presentations on consolidated progress of the project during last 6 months by Dr. Devendra Kumar and centre reports by the respective Co-PIs. A proposal for Extension of the NAIP sub-project for the period 1st July to 30th June 2014 was also presented by Dr. BP Singh. All issues related to implementation and recommendation of last CAC as well as the issues related to progress of work presented by CPI and Co-PIs were discussed at length. Several recommendations emerged from the discussions.

Institute Management Committee Meeting & Institute Joint Staff Council held at CPRS, Ooty

The 6th Meeting of Xth Institute Management Committee was held at CPRS, Muthorai, Ooty in the forenoon of 18th July, 2011. It was chaired by Dr. Bir Pal Singh, Director, CPRI, Shimla and attended by Dr. Umesh Srivastav, ADG (Hort) and five other members and two special invitees. The Chairman informed the committee about the history and establishment of CPRS, Muthorai station on account of its specific weather conditions and geographical location in South India with potato being grown in all the three seasons. Dr. Umesh Srivastav,



ADG (H) also briefed the committee members about the need for more production of potato seeds to meet the high demand of seed in the country. The Member Secretary, IMC appraised the IMC members on the action taken report of the previous meeting and thereafter agendas were discussed followed by a scientific presentation on 'Status of PCN research in India and future strategies

for its management' delivered by Dr. R. Umamaheswari, Scientist, CPRS, Muthorai. The Committee members also visited the fields and laboratory at the Station.

The VII th Meeting of the Institute Joint Staff Council was held at CPRS, Muthorai, Ooty on the afternoon of 18th July, 2011. It was chaired by Dr. Bir Pal Singh Director, CPRI Shimla

and attended by 12 other members. The chairman pointed out that the grievances of staff, if any could be solved through discussions and requested the cooperation of all staff members for the progress of the Institute. The agenda items were discussed in the meeting and decisions were made on points raised by IJSC.

Human Resource

Appointments

Name	Post	Joined on
Scientific		
Dr. Ravinder Kumar	Scientist, Plant Pathology at CPRI, Shimla	5.9.2011
Ms. Dalamu	Scientist, Horticulture-Vegetable Science at CPRI, Shimla	5.9.2011

Promotions

Name	From	To
Technical		
Smt. Shelley Chopra, Sh. Kapil Kumar Sharma, Sh. Shiv Bir Singh Parihar, Sh. SK Rastogi	T-5	T-6
Smt. Sumita Sharma, Sh. Akhilesh Kumar Singh, Sh. Prem Lal, Sh. E. Syiemlich, Sh. I Abdul Rasheed, Sh. V. Rajendran, Sh. Pushpendra Kumar, Sh. Avinash Chaudhory, Sh. Harvir Singh, Sh. Jasvir Singh, Sh. RK Samashiya, Sh. Sanjay Kumar Sharma, Sh. Devi Chand Sharam, Sh. Shiv Kumar Lal Karna, Sh. Arjun Kumar Sharma, Sh. Gutam Parsad Singh	T-4	T-5
Sh. Sheesh Ram Thakur, Sh. Khariti Lal, Sh. Yash Pal Sharma, Sh. Sudershan Singh, Sh. B. Langstieh, Sh. Shibi Kant Arya, Sh. Rakesh Srivastava, Sh. Anil Kumar	T-3	T-4
Sh. Naresh Chand Sharma, Sh. Kulwinder Singh, Sh. Praveen Kumar, Sh. Sita Ram Sahu	T-2	T-3

Transfers/Selections

Name	From	To
Scientific		
Dr. PS Naik, Project Coordinator	CPRI, Shimla	IIVR, Varanasi as Director
Dr. Manoj Kumar, Sr. Scientist	CPRI, Shimla	CPRS, Patna as Head
Dr. D Pattanayak, Sr. Scientist	CPRI, Shimla	NRCPB, New Delhi as PS

Retirements

Name	Post	Retired on
Dr. SV Singh	PS, CPRIC, Modipuram	31.7.2011
Sh. Balbir Singh	T-5 (Tractor Driver), CPRIC, Modipuram	31.07.2011
Sh. Nawab Ali	T-5 (Tractor Driver), CPRIC, Modipuram	31.08.2011
Sh. NK Gupta	AAO, CPRIC, Modipuram	31.08.2011
Sh. Khlain Singh	SSS, CPRS, Shillong	31.08.2011
Sh. Shiv Narain	SSS, CPRS, Gwalior	31.08.2011
Sh. Partap Singh	SSS, CPRS, Kufri	30.09.2011
Sh. Dharambir	SSS, CPRIC, Modipuram	30.09.2011

Demise

Name	Post	Date
Sh. Adi Lal	SSS, CPRS, Kufri	09.09.2011

Foreign Visits

- ◆ Dr. SK Kaushik, Joint Director, CPRIC, Modipuram underwent training in the area of Biosecurity (Horticulture), in the lab of Prof. KV Raman (Plant Breeding), College of Agriculture and Life Sciences, Cornell University, Ithaca, USA from 5th May to 2nd August under NAIP.
- ◆ Dr. Raj Kumar, Sr. Sci. CPRS, Jalandhar went for training in the area of “Genome Resource Conservation” (Horticulture)” with Dr. Wayne Nelles, International Potato Centre, La Molina, Peru from June 29, 2011 to September, 26, 2011 under NAIP.
- ◆ Dr. G. Ravichandran, Sr. Sci. CPRS, Muthorai is doing training in the area of Molecular Diagnostics (Horticulture), with Dr. Robert R. Martin, Research Laboratory, USDA-ARS, Corvallis, OR, USA, w.e.f. September 30, 2011 to December, 30, 2011 under NAIP.

From the Director's Desk



Agriculture is the backbone of Indian economy as more than 700 million people are still engaged in farming and allied activities for their livelihood. Despite the fact that we had achieved self-sufficiency in food grain production at this point of time; it may be inadequate to feed the burgeoning population in all time to come. In future, India needs to raise the food grain production by almost 40% by 2025 when India's population is expected to grow

1.3 billion. This may be a Himalayan task to tackle at times when Indian agriculture is facing a series of challenges in crop production systems viz., plateauing of yields in some of the major food crops, steady decline in farm income, degradation of natural resource base, emergence of new biotypes of pests and pathogens, climate change, technology fatigue etc. To address all these challenges, we have to think of an alternate technology such as “nanotechnology” which can compliment the existing technologies including biotechnology for increasing farm production and income. Nanotechnology originates from the Greek word meaning ‘dwarf’. A nanometer is one billionth (10^{-9}) of a meter. Although, nanotechnology has

shown amazing applications in the field of medicine, energy, engineering etc., its potential in the field of agriculture is yet to be explored. In this context, Nanotechnology is one such cutting edge technology which can provide sustenance to our food production by many ways including early detection and management of pests, diseases and nutrient deficiencies, enhancing input use efficiency and, avoiding/reducing spoilage through smart packaging. Central Potato Research Institute (CPRI) has already started working in this direction and has developed dipstick assay based on nano gold particles for detection of potato viruses at field level. The assay is even superior to ELISA. Now CPRI is looking forward for the detection of potato pathogens at field level by Nucleic acid based dipstick assay and also *in situ* detection of potato pathogens with the help of nanotechnology.

Compiled and edited by: Brajesh Singh, Sanjeev Sharma and VU Patil

Published by: Director, Central Potato Research Institute, Shimla 171 001, HP, India

Phone: 0177-2625073, Fax: 0177-2624460, E-mail: dircpri@icar.org.in; directorcpri@gmail.com, Website: cpri.ernet.in

Printed at: Malhotra Publishing House, B-6, DSIDC Complex, Kirti Nagar, New Delhi. E-mail: mph@vsnl.com